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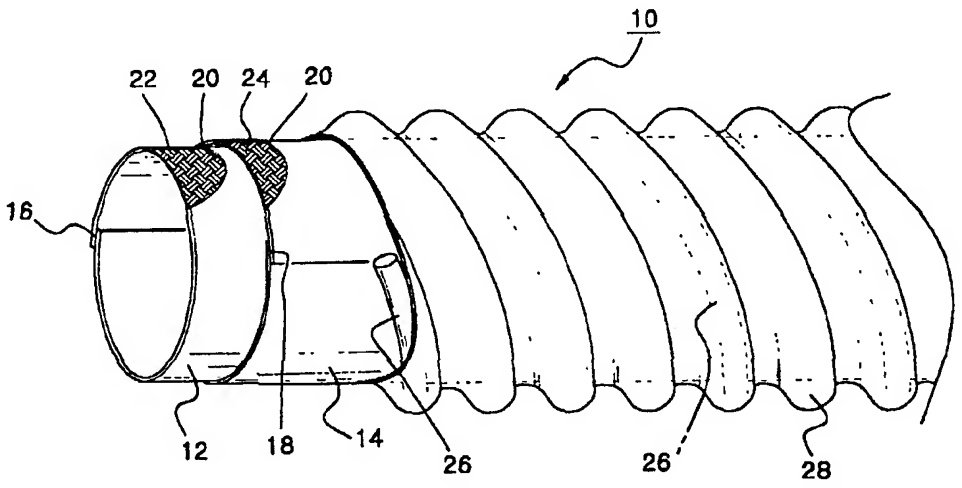
(54) Title: PRESSURE–RESISTANT HOSE USING POLYETHYLENE FABRICS

(57) Abstract

A pressure–resistant hose (10) of the present invention comprises: one or more hose layers (12, 14), said hose layers (12, 14) being formed by respectively bonding the longitudinal ends of one or more polyethylene mixture fabrics (22, 24), coated with one or more watertight films (20) at one side or both side surfaces, to form circular cross sections; a spiral core (26) fixedly wound on an outer surface of the hose layers (14), said spiral core (26) having a predetermined sectional shape; and a spirally corrugated tube (28) surrounding an outer surface of the spiral core.



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PRESSURE-RESISTANT HOSE USING POLYETHYLENE FABRICS

Technical Field

The present invention relates, in general, to a pressure-resistant hose and, more particularly, to a pressure-resistant hose, which is capable of not only effectively spouting liquid or gas of high pressure but also effectively sucking it even though the pressure-resistant hose is of a relatively small thickness, reducing the material cost of the pressure-resistant hose and improving the flexibility of the pressure-resistant hose.

Background Art

In general, a pressure-hose is utilized to convey liquid or gas to a certain location.

A conventional pressure-resistant tube comprises a first tube layer, a second tube layer and a third tube layer. The tube layers are generally made of rubber or PolyVinyl Chloride (PVC). A first fiber layer is bonded on the outer surface of the first tube layer. The second tube layer is combined with the first fiber layer at the outer surface of the first fiber layer. A second fiber layer is bonded on the outer surface of the second tube layer. The third tube layer is combined with the second fiber layer on the outer surface of the second fiber layer. The first and second fiber layers are employed while being braided to have a predetermined density. The first and second fiber layers are respectively bonded on the outer surfaces of the first and second tube layers by heating using steam. The second and third tube layers are combined with the first and second fiber layers by extracting the second and third tube layers on the outer surfaces of the first and second fiber layers, respectively.

However, in the conventional pressure-resistant pipe constructed as

described above, since the first, second and third tube layers are made of rubber or PVC and the first and second fiber layers are interposed between the neighboring tube layers of the first, second and third tube layers, the entire thickness of the pressure-resistant hose becomes relatively large, thereby increasing its manufacturing cost and deteriorating its flexibility.

Disclosure of the Invention

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a pressure-resistant hose, which is capable of not only effectively spouting liquid or gas of high pressure but also effectively sucking it though pressure-resistant hose is of a relatively small thickness, reducing the material cost of the pressure-resistant hose and improving the flexibility of the pressure-resistant hose.

In order to accomplish the above object, the present invention provides a pressure-resistant hose, comprising: one or more hose layers, said hose layers being formed by respectively bonding longitudinal ends of one or more polyethylene mixture fabrics, coated with one or more watertight films at one side or both side surfaces, to form circular cross sections; a spiral core fixedly wound on the outer surface of the hose layers, said spiral core having a predetermined sectional shape; and a spirally corrugated tube surrounding an outer surface of the spiral core.

In accordance with another aspect of the present invention, the number of said hose layers is two or more, the bonded portions of said hose layers are circumferentially spaced apart from each other so as not to be overlapped, and an outer hose layer is bonded on an outer surface of an inner hose layer.

In accordance with a further aspect of the present invention, alternate corrugations of said spirally corrugated tube are unoccupied by said spiral core.

The present invention provides a pressure-resistant hose, wherein a spiral core and a spirally corrugated tube are fixed on one or more hose layers formed by respectively bonding the longitudinal ends of a first polyethylene mixture fabric and a second polyethylene mixture fabric, coated with one or more watertight films at one side or both side surfaces, to form circular cross sections, thereby preventing the pressure-resistant hose from being shriveled by the rigidity of the spiral core and the spirally corrugated tube. As a result, the pressure-resistant hose of the present invention can be effectively utilized not only to spout liquid or gas of high pressure but also to suck it. Additionally, the pressure-resistant hose has a small thickness, has an inexpensive material cost and has a superior flexibility, in comparison with the conventional pressure-resistant hose having a plurality of rubber tube layers and a plurality of fiber layers.

Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a cutaway perspective view illustrating the construction of a pressure-resistant hose manufactured using polyethylene mixture fabric in accordance with a first embodiment of the present invention;

Fig. 2 is a sectional view of the pressure-resistant hose of Fig. 1;

Fig. 3 is a sectional view showing a pressure-resistant hose in accordance with a second embodiment of the present; and

Fig. 4 is a sectional view showing a pressure-resistant hose in accordance with a third embodiment of the present invention.

Best Mode for Carrying Out the Invention

Reference now should be made to the drawings, in which the same reference numerals are used throughout the different drawings to designate the same or similar components.

Fig. 1 is a cutaway perspective view illustrating the construction of a pressure-resistant hose manufactured using polyethylene mixture fabric in accordance with a first embodiment of the present invention. Fig. 2 is a sectional view of the pressure-resistant hose of Fig. 1.

The pressure-resistant hose 10 of the present invention comprises a first hose layer 12, a second hose layer 14, a spiral core 26 and a spirally corrugated tube 28.

The first and second hose layers 12 and 14 are respectively made of first polyethylene mixture fabric 22 and second polyethylene mixture fabric 24. The first polyethylene mixture fabric 22 and the second polyethylene mixture fabric 24 are respectively coated with watertight films 20 on inner and outer surfaces. The first polyethylene mixture fabric 22 and the second polyethylene mixture fabric 24 are respectively bonded together at their longitudinal ends to form circular cross sections, thus forming a first bonded portion 16 and a second bonded portion 18.

The outer surface of the first hose layer 12 and the inner surface of the second hose layer 14 are securely bonded together, so that the first and second hose layers 12 and 14 are not moved respectively. The first bonded portion 16 of the first hose layer 12 and the second bonded portion 18 of the second hose layer 14 are spaced apart from each other in a circumferential direction to prevent them from being overlapped. With such construction, there is prevented a problem in which pressure-resistance is deteriorated at a location where the first bonded portion 16 of the first hose layer 12 and the second bonded portion 18 of the second hose layer 14 are overlapped.

In a preferred embodiment of the present invention, the first bonded portion 16 of the first hose layer 12 and the second bonded portion 18 of the second hose layer 14 are spaced apart from each other in a circumferential

direction by 180 degrees.

The first and second hose layers 12 and 14 of the pressure-resistant hose 10 can be formed as described in the specification of a PCT application filed at the same date as that of this application and entitled "PRESSURE-RESISTANT HOSE USING POLYETHYLENE FABRICS", and the application is incorporated in this application as a reference.

That is, the first and second hose layers 12 and 14 of the pressure-resistant hose 10 can be formed by a forming method comprising the steps of: overlapping one longitudinal end with the other longitudinal end to form a circular cross section by passing the first polyethylene mixture fabric 22, coated with watertight films 20 at both surfaces, through a first guide member; applying a bonding agent on one longitudinal end of the first polyethylene mixture fabric 22; forming the first bonded portion 16 by bonding both longitudinal ends of the first polyethylene mixture fabric 22 while guiding the first polyethylene mixture fabric 22 to surround the outer surface of a central pipe; applying a bonding agent at a plurality of locations on the outer surface of the first polyethylene mixture fabric being moved along the outer surface of the central pipe; overlapping one longitudinal end with the other longitudinal end to form a circular cross section by passing the second polyethylene mixture fabric 24, coated with watertight films 24 at both surfaces, through a second guide member; applying a bonding agent on one longitudinal end of the second polyethylene mixture fabric 24; bonding the second polyethylene mixture fabric 24 on the outer surface of the first polyethylene mixture fabric 22 at a plurality of positions where a bonding agent is applied while guiding the second polyethylene mixture fabric 24 to surround the outer surface of the first polyethylene mixture fabric 22 being moved along the outer surface of the central pipe; and forming the second bonded portion 18 by bonding both longitudinal ends of the second polyethylene mixture fabric 24 being moved along the central pipe together with the first polyethylene mixture fabric 24.

In accordance with the present invention, the spiral core 26 having a

predetermined sectional shape is wound on the outer surface of the second hose layer 14. The spiral core 26 is fixed on the outer surface of the second hose layer 14 by steaming or the application of a bonding agent. Although the spiral core 26 has a circular cross section in a preferred embodiment of the present invention, it can be easily understood by those skilled in the art that the spiral core 26 may have a regularly squared cross section, a rectangular cross section or other cross sections.

Owing to the strength of the spiral core 26, the first and second hose layers 12 and 14 are prevented from being shriveled. Accordingly, the pressure-resistant hose can be effectively used not only to spout liquid or gas of high pressure but also to suck it.

The spiral core 26 is surrounded by the spirally corrugated tube 28. A plurality of corrugations are formed on the spirally corrugated tube 28 so as to accommodate the spiral core 26. The alternate corrugations 30 of the spirally corrugated tube 28 may be unoccupied by the spiral core 26, so that the pressure-resistant hose of the present invention has a superior flexibility in comparison with a conventional pressure-resistant hose having a plurality of rubber or PolyVinyl chloride (PVC) tube layers and a plurality of fiber layers. The inner surfaces of the ridges of the spirally corrugated tube 28 are bonded on the spiral core 26 by means of an appropriate method such as steaming or the application of a bonding agent, and the inner surfaces of the valleys of the spirally corrugated tube 28 are bonded on the outer surface of the second hose layer 14 by means of an appropriate method such as steaming or the application of a bonding agent.

Although there have been described embodiments wherein tube layers are surrounded by a spiral core and a spirally corrugated tube, the objects of the present invention can be achieved effectively when the spiral core is excepted from the construction of the present invention as depicted in Fig. 4.

In such a third embodiment, a pressure-resistant hose comprises one or more hose layers 12 and 14 formed by respectively bonding the longitudinal ends

of a first polyethylene mixture fabric 22 and a second polyethylene mixture fabric 24, coated with one or more watertight films at both side surfaces, to form circular cross sections, and a spirally corrugated tube 28 having a predetermined shape and surrounding the hose layers 12 and 14.

In the third embodiment, since the spirally corrugated tube 28 surrounding the outer surfaces of the hose layers 12 and 14 is made of a rigid material having a predetermined rigidity, the size of the cross section of the spirally corrugated tube 28 is prevented from being reduced by means of the rigidity of the spirally corrugated tube 28.

Industrial Applicability

As described above, the present invention provides a pressure-resistant hose, wherein a spiral core and a spirally corrugated tube are fixed on one or more hose layers 12 and 14 formed by respectively bonding the longitudinal ends of a first polyethylene mixture fabric 22 and a second polyethylene mixture fabric 24, coated with one or more watertight films at one side or both side surfaces, to form circular cross sections, thereby preventing the pressure-resistant hose from being shriveled by the rigidity of the spiral core and the spirally corrugated tube. As a result, the pressure-resistant hose of the present invention can be effectively utilized not only to spout liquid or gas of high pressure but also to suck it. Additionally, the pressure-resistant hose has a small thickness, has an inexpensive material cost and has a superior flexibility, in comparison with the conventional pressure-resistant hose having a plurality of rubber tube layers and a plurality of fiber layers.

Although the pressure-resistant hose 10 is depicted to have two hose layers, it should be understood that the pressure-resistant hose 10 may have one hose layer, or two or more hose layers according to desired characteristics.

Claims

1. A pressure-resistant hose, comprising:

one or more hose layers, said hose layers being formed by respectively bonding longitudinal ends of one or more polyethylene mixture fabrics, coated with one or more watertight films at one side or both side surfaces, to form circular cross sections;

a spiral core fixedly wound on an outer surface of the hose layers, said spiral core having a predetermined sectional shape; and

a spirally corrugated tube surrounding an outer surface of the spiral core.

2. The hose according to claim 1, wherein the number of said hose layers is two or more, the bonded portions of said hose layers are circumferentially spaced apart from each other so as not to be overlapped, and an outer hose layer is bonded on an outer surface of an inner hose layer.

3. The hose according to claim 1, wherein alternate corrugations of said spirally corrugated tube are unoccupied by said spiral core.

4. A pressure-resistant hose, comprising:

one or more hose layers, formed by respectively bonding the longitudinal ends of one or more polyethylene mixture fabrics coated with one or more watertight films at one side or both side surfaces, into the shape of tubes; and

a spirally corrugated tube surrounding the hose layers.

FIG 1

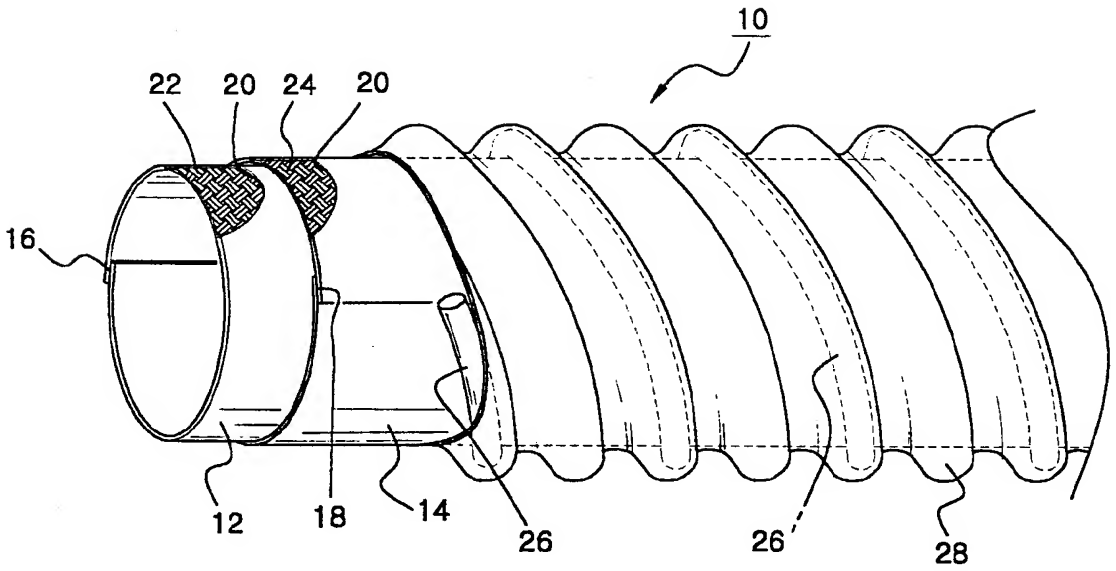


FIG 2

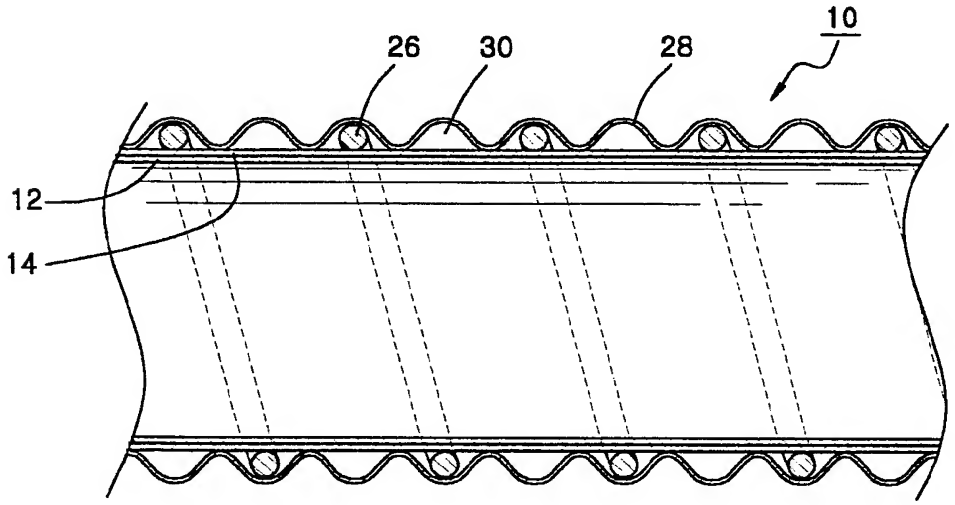


FIG 3

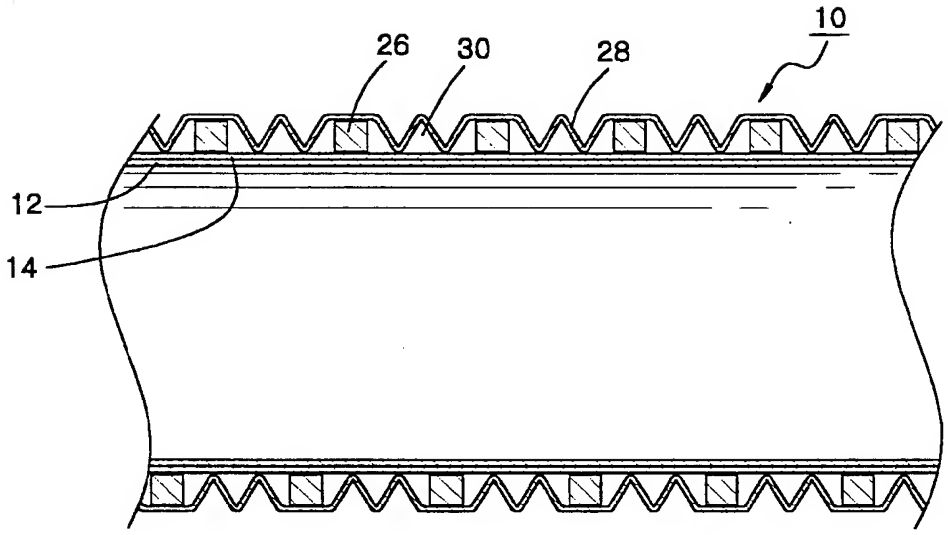
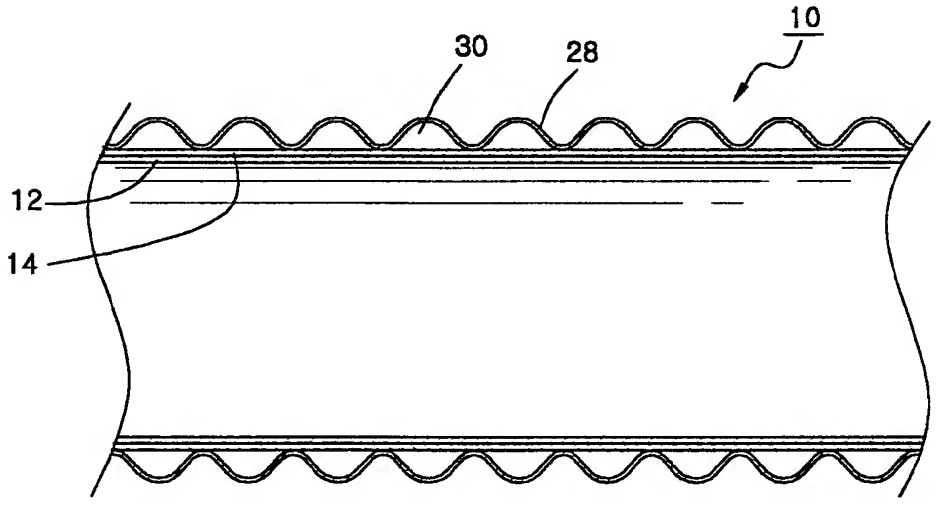


FIG 4



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR00/00308

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 F16L 19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC F16L 11/08, 11/12, 19/00, B29C 35/06

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean Patents and applications for inventions since 1975
Korean Utility models and applications for inventions since 1975
Japanese Utility models and applications for inventions since 1970

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4957792 A(Toyo tire & Rubber Co., Ltd.) 18 September 1990(18. 09. 90) claim1, 3, 4, 5 Fig.2.	1, 4
Y	JP 08072177 A(Bridgestone Corp.) 19 March 1996(19. 03. 1996) claim1- 11. Fig. 1	1, 2, 4
Y	JP 01182031 A(Toyo chemical Co. Ltd) 19 July 1989(19. 07. 89) claim1- 4 Fig.1, 2.	1, 2, 4

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4957792 A	18. 09. 90	JP 2021093 A DE 3838008 A	24. 01. 90 18. 05. 89
JP 08072177 A	19. 03. 96	None	
JP 01182031 A	19. 07. 89	None	